IDENTIFICATION OF FORGED BANK OF ENGLAND 20 GBP BANKNOTES USING IR SPECTROSCOPY

EMILY SONNEX, *Department of Chemistry, University of Reading, Reading, United Kingdom.*

Bank of England notes of 20 GBP denomination have been studied using infrared spectroscopy in order to generate a method to identify forged notes. A principal aim of this work was to develop a method so that a small, compact ATR FTIR instrument could be used by bank workers, police departments or others such as shop assistants to identify forged notes in a non-lab setting. The ease of use of the instrument is the key to this method, as well as the relatively low cost. The presence of a peak at 1400 $\mathrm{cm}^{-1}$from the blank paper section of a forged note proved to be a successful indicator of the note's illegality for the notes that we studied. Moreover, differences between the spectra of forged and genuine 20 GBP notes were observed in the ν(OH) (ca. 3500 cm^{-1}), ν(C-H) (ca. 2900 cm^{-1}) and ν(C=O) (ca. 1750 cm^{-1}) regions of the IR spectrum recorded for the polymer film covering the holographic strip. In cases where these simple tests fail, we have shown how an infrared microscope can be used to further differentiate genuine and forged banknotes by producing infrared maps of selected areas of the note contrasting inks with background paper. Further to this, with an announcement by the Bank of England to produce polymer banknotes in the future, the work has been extended using Australian polymer banknotes to show that the method would be transferable.